Canyon Area Tour District Feasibility Study

Yellowstone National Park

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0. Executive Summary

The goal of this document is to evaluate the feasibility of a tour district in the Grand Canyon of Yellowstone. To reach this goal, the primary objective is to answer these questions:

1. Is the timing appropriate to pursue bus touring in the Canyon Area?
2. Do comparative examples exist elsewhere in the park?
3. Would the district help achieve the larger goals of the park and enhance the visitor experience?
4. What are the costs associated, to the park, tour operator, and park visitor?
5. Given the combination of these factors, is a Canyon Area tour district feasible?

Recommendations

After evaluating the tour district's feasibility, the district appears both feasible and desirable. An implementation should consider:

- beginning with a small scale system, focusing on 3 to 4 tours daily during peak visitation,
- marketing the system well; the goal should be to have full buses with happy riders for the entire season,
- focusing the system on being tour oriented, including: a sign-up, fee-based reservation system, and extensive park interpretation during the tour, and
- using unique vehicles like the comparable Sunset Tour of Lake Butte that is conducted on historic Old Yellow Buses; a similar unique vehicle will capture the specialness of Yellowstone and promote adoption.

Costs

Although operational costs would be absorbed by the tour operator, there are additional capital and start-up costs. These include:

- bus acquisition (approximately $400,000 - $900,000 to purchase 4 buses),
- marketing and education: interpretive information, signage, and advertising,
- training for park and concessionaire staff – especially for an additional offering in a reservation system, and
- staging areas, bus stops, benches, and other tangible infrastructure components.

Transit

Initially, transit was examined as an alternative. Transit in the Canyon Area would be defined as buses operating between the Canyon Visitor's Center, overlooks, and other services (shopping, post office, etc.). These buses would potentially operate at least 8 hours a day, with a frequency between every hour and every 15 minutes. Such a system would be costly. For example, operating 30 minute service throughout the summer season would cost $160,000 (not including bus acquisition). At 50% occupancy, this would transport 16,000 riders per season at a cost of $11 per rider (approximately less than 1% of the Canyon Area's peak season visitation). Transit as an alternative is discussed in greater detail in Appendix A. Given that such a system would be voluntary and that to attract riders, the transit service would either be free or for a nominal fee, it would require a large subsidy. Although these estimations are approximate and based on limited available data, they do indicate that investing in transit is not currently financially feasible. As an alternative, the small scale tour system proposed in this document will help test the waters and better establish demand for alternative transportation in the Canyon Area.

Tour District Concept

In the winter of 2003/2004, Yellowstone conducted a feasibility study of a Clean Bus Tour/Transit District (Barron, 2004). The recommendations from that report dovetail into this work, specifically to begin with a small scale system at a major attraction(s) in an area with advantageous geography. This report is a micro-study of the larger Tour/Transit District concept.

Timing

The factors that make Canyon an attractive location for touring are discussed in chapter 2. In addition to its well suited location, current developments in Canyon could help promote a pilot tour district implementation within the next few seasons. Such synergistic factors include:

- renovation of 8 historic Old Yellow Buses,
- availability of Original Equipment Manufacturer New Yellow Buses,
- renewal of Xanterra's 5 year concessionaire contract beginning November 2005,
- landscape renovations of prominent Canyon Area overlooks: Inspiration Point, Brink of the Upper Falls, and Artist Point, and

- unveiling of the new Canyon Area Visitor Center in late-summer 2006.

If the district can be implemented within the next few seasons, it will be able to capitalize on these developments and highlight the Grand Canyon of Yellowstone as a premier destination.

The remainder of this document examines a pilot Canyon Area tour district in greater detail.

1. Background—Current Trends in the Park and Canyon Area

Over the past 10 years, visitation in Yellowstone has remained flat, at roughly 3 million annual visitors. This trend may be deceiving, as during this same period throughout the park, the National Park Service has been working to replace and modernize aging infrastructure. These enhancements include road improvement projects, which in turn can support larger vehicles, and new or rehabilitated visitor centers, both of which can lengthen visitor stays. These and other improvements may be subtly altering visitor (and vehicle) type and use patterns while overall visitation remains the same (parkwide visitor and vehicle surveys have not occurred since the mid-1990s). This promotion of an enhanced visitor experience is half the dual goal of the national parks, the other half being to protect the cultural and natural resources.

Road Improvements and Larger Vehicle Support

The purpose of park roads was documented in the National Park Service Park Road Standards: to enhance visitor experience while providing visitors with safe and efficient accommodation (NPS, 1984). The Yellowstone National Park Master Plan also provides relevant background:

> Modifications and improvements initiated since the turn of the century have transformed into a primary through-system what was conceived of as, and remains – in standard and design – a secondary road circulation system. Developed for the most part in the railroad-stagecoach era by the Army, the park's road system is now overburdened due to the phenomenal growth of automobile travel, for which it was never designed. Complicating this problem and frustrating the solution is the fact that Yellowstone National Park's interior roads also serve as the strategic keystone to the region's limited internal transportation network (NPS, 1974).

The 1993 Parkwide Road Improvement Plan Environmental Assessment addressed park roads by a program of major reconstruction (4R) and resurfacing, restoring, and rehabilitating (3R) of roads throughout the park. Namely, these improvements are to address concerns of;

- The Federal Highway Administration's rating of 71.6% of the condition of the park's roads as fair to very poor (FHWA, 1990);
- Support of a mixture of vehicles, including bicycles, recreational vehicles (RVs), and tour buses;
- Support of the current volume of traffic and heavier weight of vehicles;
- Complaints by visitors of poor road quality; and

- Roughly 2% of vehicular accidents attributed to road defects (25 total incidents out of 1,228 in a three-year period between 1982 and 1984) (NPS, 1992).

These studies and evaluations have led the park to work toward improving the safety, efficiency, and capacity of roads throughout the park, and the result has been an improved road surface (smoother, higher quality) and an increase in the average width of roads throughout Yellowstone.

Long Range Interpretive plan

Similar to improving roads, the Yellowstone Long Range Interpretive Plan seeks to enhance the visitor experience. The plan addresses various aspects of this visitor experience, and a few of the proposed components include:

- a new system which would alert visitors to roadside exhibits and attractions;
- providing interpretive media that highlights Yellowstone's greening efforts (such as the use of biofuels and recycled plastic boardwalks at the geyser basins);
- expansion of the number and variety of interpretive programs, including walks and talks targeted at specific age groups;
- exploration of non-traditional modes of transportation to reach the greatest number of visitors, especially for rangers during roving assignments; and
- new or rehabilitated visitor centers that offer "one-stop-shopping" – access to permits, exhibits, education, etc. in one location (YNP, 2000).

By improving access with better and wider roads and seeking more opportunities to connect with visitors, Yellowstone is promoting an enhanced visitor experience that will likely lead to longer stays or visits in the park.

Developed Footprint

Paradoxically, although the park may be latently promoting longer stays, the infrastructure is somewhat static, especially concerning parking. Given the mission of the park to maintain natural resources and respect ecologically delicate portions of Yellowstone, the park has made efforts to generally stabilize or decrease the developed footprint of the park. Where possible, management is working to increase parking capacity through design efficiencies. In select

parking lots, this has resulted in a valuable increase of 2 or 3 parking spaces. In other instances, to support larger vehicles, tour buses, and pedestrian access, large vehicle parking areas are appropriately built into existing footprints. This often results in a net parking loss. This loss is occurring in the Canyon Village Area where redevelopment of the visitor center and parking lot is underway.

Grand Canyon of Yellowstone

The Canyon area is an excellent representation of the park as a whole, and as a case study it replicates many of the larger park trends mentioned above. Roads leading to the major overlooks are planned to be resurfaced in a forthcoming 3R project. The Canyon Visitor Center is under renovation and will double in size from 11,000 to 22,000 square feet and offer new exhibits. The Artist's Point landscape renovation will improve pedestrian and bus access and likely reduce net parking. Visitor lodging will be renovated. Canyon is already a prominent destination in the park, with over 68% of visitors surveyed stopping in the area and overall visitation only second to Old Faithful (YNP, 2002). Renovations and enhancements to the Canyon Visitor Center will likely promote longer stays, and yet the redevelopment may reduce net parking capacity by up to 10%.

Tour/Transit District

The overall trends of the park offer an opportunity to be proactive by offering visitors alternative transportation options that enhance their park experiences. Alternative transportation options could also help achieve goals established by Yellowstone's Division of Interpretation and help mitigate congestion and potentially compressed parking.

The Canyon area is unique in that it captures the current trends of the park while also providing high visitation, relatively compact size, one-way roads, and established visitor travel patterns and routes. Canyon is highly desirable as a pilot-area for a potential tour/transit system in Yellowstone. The balance of this document examines a potential implementation of a pilot tour/transit district in the Grand Canyon of Yellowstone.

2. Grand Canyon of Yellowstone

The Lower Falls of the Grand Canyon of Yellowstone is 308 feet tall, over 1 ½ times the height of the taller of the Niagara Falls. The Canyon Area's overlooks showcase incredible views of the falls, scenery, and Yellowstone River, making it a premier destination in the park. The view of the Lower Falls from Artist's Point probably ranks with Old Faithful as an icon of the national parks. Table 1 offers a snapshot of visitation in Yellowstone and how that translates to the Canyon Area. All data refers to 2002, unless noted (NPS, 2002-2003).

Table 1 Yellowstone and Canyon Area Statistics

Yellowstone National Park		
	Recreational visits	2,983,053
	Recreational visits during peak season (July & August)	1,500,000
	Estimated number of occupants per vehicle	3
	Estimated number of visiting vehicles	1,000,000
	Average length of stay in days	1.5
Canyon Area of Yellowstone		
	Percentage of Yellowstone visitors touring Canyon	68-70%
	Recreational visits	+2,000,000
	Estimated number of visiting vehicles	+650,000
	Daily recreational visits during peak season (2003)	17,500
	Daily Canyon Visitor Center visits during peak season (2003)	4,000
	Daily average number of vehicles on Canyon roads during peak season	+5,000

On a peak summer day, over 5,000 vehicles are traveling the Canyon Area roads – less than a 15 mile portion of Yellowstone's 329 miles of paved roads. This is a tremendous amount of travel for such a small area of the park.

Canyon – Why is it such a Popular Destination?

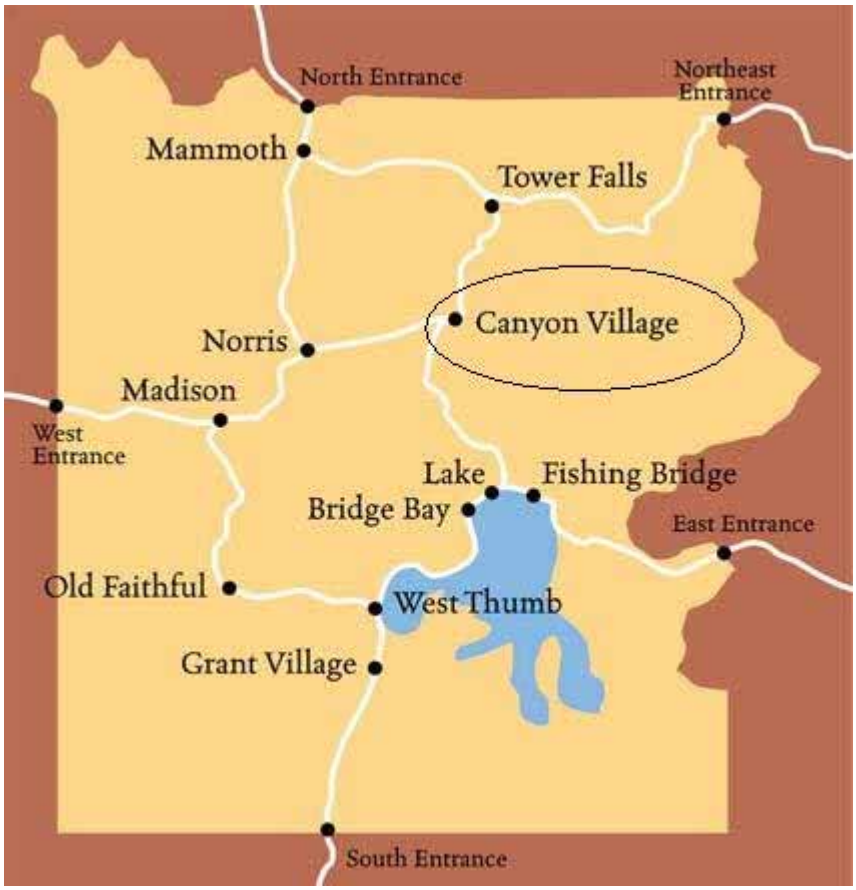
The spectacular scenes from Canyon Area overlooks, like Inspiration and Artist's Point, give visitors memorable views and the opportunity to take a photographs from places that inspired famous painters such as Thomas Moran. Picture 1 gives an example of one of the many Lower Falls views, and one can easily see how the Canyon Area became the second most visited destination in the park, next to Old Faithful. Nevertheless, the incredible views are only part of the story as to why the Canyon Area is so popular.

Yellowstone is massive, covering over 2.2 million acres, and yet the average visitor spends just a day and half in the park – often trying to reach a handful of the park's 12 or more major attractions. 75% of visitors enter one entrance of the park and exit another (NPS, 1994). This through-travel suggests another reason for Canyon's popularity – its location. Map 1 illustrates Canyon's very central location. Canyon sits right in the middle of the lower and upper loops that make up Yellowstone's figure 8 shaped roadways.

Photo 1 Lower Falls

Lodging at Canyon is not only central but also inexpensive. The area offers campsites, lodge rooms, and cabins. The cabins are some of the least expensive lodging within park and latently promote the Canyon Area and attract overnight stays. Although many of the cabins are also in need of repair or replacement, the Canyon area offers several hundred lodging units and campsites, making it one of the largest concentrations of overnight accommodations in the park.

By adding the travel behavior of visitors, location, and low accommodation costs to the spectacular views of Canyon, the area is even further promoted as a trademark destination in Yellowstone. This trend will continue to grow, as new developments will likely draw more visitors and/or increase the length of visitor stays.



Map 1 Yellowstone with Canyon Area Circled (Xanterra Inc, 2005.)

New Developments –Renovations & Wildlife Corridor Preservation

As mentioned earlier, the Canyon Visitor Center is currently under renovation that will ultimately: double its size and significantly improved and additional exhibits.. At least three of the most popular overlooks, Inspiration Point, Brink of the Upper Falls, and Artist Point, will undergo substantial landscape renovations. The overlook renovations will include better parking areas for buses and larger vehicles, improved handicapped access, and improved turning radii for larger vehicles. Much of the work on the overlooks has been funded through donated monies and the Federal Lands Highway Program.

These renovations will not increase the park's local developed footprint, especially since the Canyon Area is an important travel corridor for wildlife. The shape of the Grand Canyon of Yellowstone acts as a geographic barrier that inadvertently directs wildlife toward developed areas, and the Canyon Area is considered important habitat, especially for Grizzly Bears whose status is documented as "Threatened" and therefore protected under the Endangered Species Act (TESS, 2005).

Because of Canyon's status as a premiere destination, its relatively compact size and relatively intensive visitor use and development patterns combined with resource sensitivity, the park evaluated transportation alternatives in the Canyon Area.

Previous Research & Ongoing Challenges

In 1994, the National Park Service published the Alternative Transportation Modes Feasibility Study (ATMFS) in Yellowstone. The study examined alternative modes in the park to help mitigate growing congestion from personal vehicles and to enhance visitor experience. In the Canyon Area, the ATMFS identified 3 alternatives:

1. Close the North Rim drive to personal automobiles and offer frequent shuttle service from the Canyon Visitor Center to the overlooks.
2. Close the South Rim Drive from Uncle Tom's to Artist Point and offer frequent shuttle service between the South Rim overlooks.
3. Close the South Rim Drive from the Uncle Tom's to Artist Point and offer frequent elevated monorail service between the two South Rim overlooks (NPS, 1994).

The ATMFS aptly characterized the Canyon Area as one of the most cost-effective areas of the park to implement alternative visitor transportation system(s), given the compact area and short length of routes (NPS, 1994). A number of barriers have kept these alternatives from being implemented, with the predominant one being cost. The infrastructure necessary to support transporting the 2 million annual visitors to the Canyon Area would require substantial initial and ongoing investments. Such a big financial leap in an unproven transit system is simply not pragmatic. A smaller, more proven approach that grew over time would be more appropriate and

better reflect the administrative style of the national park system. Nevertheless, the opportunity to expand the park's offering to visitors through alternative transportation remains, and the Canyon Area continues to be a clear candidate.

Recommendation & Current Opportunity

Yellowstone could greatly enhance visitor experience by offering voluntary alternative transportation options in the Canyon Area. This area is well poised for such a system, given its compact size and central location, and it would integrate well with the new interpretive offerings at the Visitor Center and overlooks. A tour system would further help achieve the goals established by Yellowstone's Long Range Interpretive Plan. The timing of the renovations and a nascent tour system would coincide well with an expansion of the current concessionaire tours. In November 2005 Xanterra began a newly awarded 5 year concessions contract, which authorizes interpretive tours using large, over-road tour buses and the historic yellow buses. This provides a window of stability and an authorization to introduce a new system. Xanterra currently offers tours throughout the park in large, over-road buses and tours in the Lake area via the historic Old Yellow Buses

The Xanterra contract also provided funding to renovate 8 of the 1930's White Model Tour Buses (known as the historic *Old Yellow Buses*). In addition, the park has led the development of a new vehicle, which was prototyped and tested in 2003/2004 (referred to as the *New Yellow Buses*). These investments, that were intended to support general transportation efforts across the park and Greater Yellowstone, could supplement an effort in the Canyon Area and help mitigate what might otherwise be localized sunk costs.

Yellowstone should capitalize on these current trends and opportunities. A pilot tour district in the Canyon Area would implement the suggestions from the Alternative Transportation Modes Feasibility Study on a small scale, and establish visitor demand. If implemented and received well, the tour district could expand over time to encompass a more transit oriented environment in the Canyon Area and act as a case study for the park as a whole. The remainder of this document examines the development and costs associated with an implementation of a tour district in the Grand Canyon of Yellowstone.

3. Existing Tour – Sunset Tour on Historic Old Yellow Bus

Yellowstone's current concessionaire (2005), Xanterra Inc., operates several bus and motor coach tours throughout the park. Xanterra's contract with Yellowstone requires that the concessionaire offer tours of the roads that make up the upper and lower loop roads (illustrated in Map 1). These required tours use large, over-road (about 40-passenger) buses, are 5 - 9 hours in length, and provide visitors the opportunity to have a guided visit of a number of features of the park.

For the purposes of a evaluating a potential tour in the Canyon Area, Xanterra's Sunset Tour in the Lake Butte area is the most appropriate comparable, due to the voluntary offering, vehicle type, and duration of tours. More specifically, the Sunset Tours are:

- not required by contract and therefore better represent market demand and costs;
- conducted on the historic Old Yellow Buses, one of the vehicles targeted for the Canyon Area (shown in Photo 2); and
- a shorter length of 2 hours, an appropriate amount of time to tour the short distances of the Canyon Area.

Photo 2 1930s White Tour Bus near Mammoth Hot Springs, Wyoming

Lake Butte Sunset Tours

The popular Sunset Tours on the historic Old Yellow Buses are offered from early June through September. The park's concessionaire claims that the historic buses practically sell themselves and, combined with the high level of interpretation, provide a one-of-a-kind park experience (Xanterra, 2005). Advertisement for the tour provided on Xanterra's Yellowstone web site, and on a poster / sign board at the Lake Hotel Lobby. Plus, the historic vehicle sits under the entry of

the Lake Hotel, to serve as advertisement for the tour and to encourage visitors to take their pictures with the vehicle.

The primary route departs from the Lake Hotel, travels to the Lake Butte Overlook (off of the East Entrance Road), and returns to the hotel about 2 hours later. The Fishing Bridge RV Park is an additional pick up and drop off point. Cost is $25 for adults and $12 for those under 16 years old (Xanterra, 2005). In general, bus tours throughout the park are patronized mostly by adults, but these shorter tours on the historic Old Yellow Buses tend to attract more youths, again due to the unique vehicle type (Old Yellow Bus replica toys are sold in park gift shops) and shorter duration; other popular motor coach-based tours are much longer, such as the 8 ½ hour Circle of Fire Tour. Xanterra estimates that 85-90% riders on the Sunset Tour are adults.

The following definitions apply to the Sunset Tour, and Table 3 illustrates estimated concessionaire revenue and costs. All estimates are based on a conservative interpretation of available data.

Season length: the Park's peak season which is approximately 100 days (roughly Memorial Day to Labor Day).

Operation days: during peak season, the busiest days in the park are Tuesday, Wednesday and Thursday; Xanterra offers the Sunset Tour Tuesday through Saturday.

Tour overhead: an additional 25% of tour time is added to the tour to include picking up the vehicle, performing safety checks, waiting time before and after tours, returning the vehicle, time spent at the maintenance facility, etc.

Acquisition costs: acquisition costs are not included in hourly costs, and costs for three potential vehicle types are listed separately in the next chapter in Table 3. The variance of vehicle type and use make it infeasible to combine acquisition and/or amortization costs with hourly costs. For example, buses used on interpretive tours would show much different mileage and wear and tear when compared to vehicles used for traditional transit. Similarly, vehicles

targeted for use primarily during peak season versus year-round would have much different maintenance and lifespan periods.

Hourly costs: the hourly cost is estimated at $90/hr. This is a high average based on other parks and service providers. Sources were understandably reluctant to disclose exact expenses, and costs ranged from $65 - $115/hour. For a specific example, Golden Gate National Recreation Area estimates transit costs between $85 to $115/hour (GGNRA, 2004). Costs in Yellowstone should be somewhat less (primarily due to lower labor costs), but $90/hour was chosen to err on the conservative side. Hourly costs include all operational costs, such as: driver wage and benefits, training, vehicle maintenance, fuel, insurance, and storage.

Occupancy: Xanterra estimates that these tours run at approximately 85% occupancy throughout the season. Again, to be conservative, Table 2 uses 70% occupancy.

Table 2 Estimated Revenue and Costs for Sunset Tour on Historic Old Yellow Buses

Length of tour in hours	2
Length of tour + 25% overhead	2.5
Number of tours per day	1
Length of season in days	100
Number of tours per season (Tues. - Sat.)	71
Capacity of vehicle	17
Number of riders at 70% occupancy	12
Estimated Number of adults at 70% occupancy	10
Estimated Number of youths (under 16) at 70% occupancy	2
Cost adult	$25
Cost youth	$12
Revenue per tour	$274
Revenue per season	$19,593
Revenue per hour	$110
Estimated cost per hour	$90
Estimated cost per tour	$225
Estimated cost per season	$16,071
Estimated profit per hour	$20
Estimated profit per season	**$3,521**
Percent profit	**22%**

The numbers in Table 2 are estimates based on available data and conservative assumptions. Although the key variables of occupancy rate and hourly cost are very conservative, the concessionaire still shows an acceptable profit (over 20%). These results suggest that this estimate can be used to project the financial suitability of a potential tour in the Canyon Area. A Canyon Area tour and associated costs are discussed in the next chapter.

4. Proposed Tour – Canyon Area on New/Old Yellow Bus

When evaluating the suitability of the tour district, two questions arose:

1) Should the tour district be expanded to include transit throughout the Canyon Area?
2) Why doesn't the concessionaire offer tours of the Canyon Area now?

These questions and preliminary costs for a pilot tour district in the Grand Canyon of Yellowstone are discussed in this chapter.

Touring and Transit in the Canyon Area

The Canyon Area is desirable for touring, due to the area's:

- high visitation,
- high number of overnight guests, and
- short distances between the overlooks and local services.

These features suggest that Canyon might also be suitable for transit. The Alternative Transportation Modes Feasibility Study first looked at a transit shuttle in the Canyon Area in 1994. Although Canyon was described as being one of the most feasible locales within the park to offer transit, the figures projected initial construction and equipment costs between $4.9 and $6.5 million for the South and North Rim Drives, respectively. Annual operating costs for either Rim Drive would cost an additional $600,000 to $800,000 annually (NPS, 1994). Such a large initial investment was and is currently infeasible, and operating either system would represent at least 2 – 3% of the park's annual operating budget, given that these numbers have not been adjusted to reflect inflation (NPS, 2004).

During this current study, transit was examined again, and cursory figures suggest that a voluntary system is financially infeasible. A constraint placed on this study was that no additional financial burden be placed on park operating or fee funds. If the park were to shut down a portion of the Canyon Rim Drives and make a shuttle service mandatory, as is the current situation during the winter months with snow coach tours on the North Rim, costs per rider might improve. Given that any system would be voluntary for the foreseeable future, transit is

not currently feasible. The preliminary transit costs and a discussion of mandatory versus voluntary systems are contained in Appendix A.

Concessionaire Barrier – Vehicle Availability

The previous chapter benchmarked costs for existing tour service in the Yellowstone Lake Area. The clear financial gain begs the question of why the concessionaire is not offering a tour of the Canyon Area now. The answer is simple: lack of vehicles. As discussed earlier, much of the success of the current Lake tours is based on the draw that the historic Old Yellow Buses have with visitors. The unique vehicle, combined with the unique park experience, has resulted in a very popular tour with high occupancy rates. Without additional vehicles, the concessionaire cannot expand their offering. Discussions with Xanterra indicated a high level of interest in acquiring and using additional vehicles, and the Canyon Area was a clear target for expanded tour service (Xanterra, 2005).

The five year concessionaire contract cycle is appropriate to keep costs within the park competitive. This is especially true to keeping the park accessible to all income levels regarding universally desired services such as food and lodging. However, this cycle prohibits the concessionaire from acquiring assets that do not recover costs when amortized within this five year time frame.

The park is aware of this barrier, especially in cases where a capital investment could drastically enhance the visitor experience while simultaneously promote other park goals such as alternative fuel use and showcasing efforts like the Greening of Yellowstone – Yellowstone's program to promote environmental sustainability. Funding has been identified to restore and renovate 8 more historic Old Yellow Buses. However, there is a limit to the number and lifespan of the historic Old Yellow Buses. To address this lack of supply, Yellowstone has partnered with the Department of Energy and others to research new vehicles that could enhance the visitor experience and attract similar ridership to the historic Old Yellow Buses. The vehicle that has emerged from this effort has been named the New Yellow Bus, and a first production vehicle is shown in Photo 3.

Photo 3 New Yellow Bus (NPS, 2005)

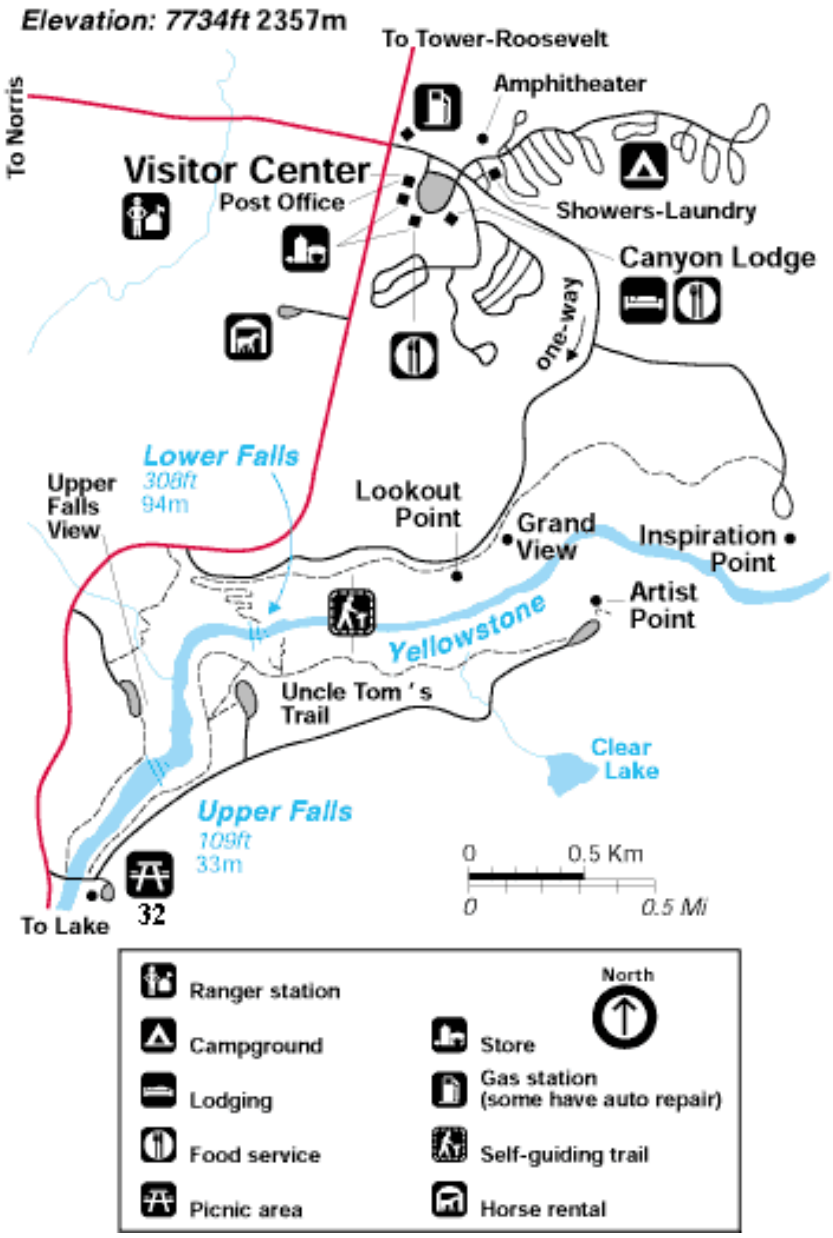
Proposed Canyon Area Tour

The specific route, stop locations, duration, and frequency of a Canyon Area Tour would be included in the operator proposal and is therefore outside the scope of this document. Nevertheless, a suggestion of one possible alternative is given here to help benchmark timing and associated costs. Map 2 shows a map of the Canyon Area.

One potential tour route might depart from the Canyon Area Visitor Center and tour four overlooks:

- Inspiration Point,
- Lookout Point,
- Uncle Tom's, and
- Artist Point.

This roundtrip distance is approximately 10.4 miles. Tours in which different overlooks were chosen would be very close in distance, with the two longest distances on the route being the roundtrips to Inspiration Point (1.6 miles) and Artist Point (2.0) miles.



Map 2 Canyon Area Roads and Overlooks (NPS, 2005)

The following definitions apply to the Canyon Tour, and Table 3 shows estimated tour cycle time. All estimates are based on a conservative interpretation of available data.

Travel speed: given that tours must start from 0 mph and not exceed the parks posted speed limit of 45 mph (many of the Canyon area roads have a limit of 35mph), the proposed Canyon

Tour uses the estimation of 20 mph to compensate for the use of a variety of vehicles and to include delays caused by congestion, wildlife crossings, etc.

Time spent at each stop: this estimation includes parking, disembarking, pedestrian travel to the overlook, and time for photographs and onsite interpretation.

Driver recovery time: a break for the driver and also buffer time for unforeseen events (breakdowns, etc.).

Cycle time: the all-inclusive duration of the trip including: travel time, time spent at each stop, and recovery time.

Table 3 Cycle Time of Canyon Area Tour

Roundtrip distance in miles	10.4
Drive speed in mph (average)	20
Number of stops (overlooks)	4
Time spent at each stop in minutes	15
Pick and drop-off time per tour	10
Driver recovery time in minutes	15
Cycle time in minutes	**118**

The time estimation of 118 minutes in Table 3 illustrates that it would be feasible to offer tours of the Canyon Area in less than two hours. To maximize vehicle use, tours could be offered back-to-back at the discretion of the tour operator. Using the cost/revenue estimates from the Sunset Tour in Table 2, Table 4 illustrates potential costs and revenues of offering 1, 2, 3, and 4 daily tours in the Canyon Area.

Table 4 Revenue, Estimated Costs, & Estimated Profits of 1-4 Canyon Tours Daily

	Number of Tours per Day			
	1	2	3	4
Revenue per day	$274	$549	$823	$1,097
Revenue per season	$19,593	$39,185	$58,778	$78,370
Estimated cost per day	$225	$450	$675	$900
Estimated cost per season	$16,071	$32,143	$48,214	$64,286
Estimated profit per day	$49	$98	$147	$196
Estimated profit per season	**$3,521**	**$7,042**	**$10,563**	**$14,084**

It is important to highlight the vehicle acquisition costs. The cost estimates for the existing Sunset Tour in Table 2 and the proposed Canyon Area tour in Table 4 are only operational costs. The cost of acquiring buses, or rolling stock, is not included in these estimates and would substantially increase overall costs. This cost increase is especially prevalent when using unique vehicles, such as the proposed Old and New Yellow Buses that are more expensive and may have limited warrantee coverage and periods. To illustrate this additional cost, Glacier National Park recently renovated 33 historic Old Red Buses which are now the primary mode used on tours on the Going-to-the-Sun Tour. This renovation cost $230,000 per historic vehicle for a warrantee period of 10 years (Bond, 2005). Applying this number in a simple amortization to Yellowstone would add an additional cost of $23,000 per vehicle per year.

Table 5 shows acquisition costs for 3 potential vehicles. The Old Yellow Bus is shown in Photo 1, the New Yellow Bus is shown in Photo 2, and the custom Ford E450 Admiral shuttle bus (also yellow) is shown in Photo 3. Costs for a stock Ford E450 Admiral start at $70,000; the model shown includes custom paint and accessories (DVD player, ski and bicycle racks, etc.) and retailed for about $90,000. Warrantee periods for all vehicles are estimated at 10 years and are based on two examples: the 10 year warrantee period for the renovated historic Old Red Buses at Glacier National Park (Scott, 2005) and the 10 year cycle for standard passenger buses used throughout Golden Gate National Park as dictated by the Metropolitan Transportation Commission (Bignardi, 2004).

Table 5 Additional Cost: Vehicle Acquisition

Vehicle Type	Capacity	Cost	Annual Cost Over Warrantee Period
Old Yellow Bus	17	$230,000	$23,000
New Yellow Bus	20	$160,000	$16,000
Ford E450 Admiral Shuttle Bus	14	$90,000	$9,000

Photo 4 Ford E450 Admiral Shuttle Bus

Conclusion

Based on the existing Sunset Tour in the Yellowstone Lake Area, and the scenario in Canyon, a tour in the Canyon Area appears both feasible and desirable. The largest barrier is access to unique vehicles and the initial investment in rolling stock.

5. Recommendations & Summary

With the direct comparison of the Sunset Tour offered by Xanterra, a pilot Canyon Area Tour appears both feasible and desirable. This chapter highlights the potential barriers, opportunities, benefits, and next steps of such a system.

Potential Barriers

The primary barriers are rolling stock and infrastructure. The concessionaire or other chosen tour operator should be able to offer the service and cover operating costs while still making over a 20% profit, and to maximize labor, could offer 3 to 4 trips a day with a single vehicle and driver. As discussed previously, the infrastructure investments would need to be initiated by the park and possibly funded by an outside source. Potential infrastructure and support needs include but are not limited to:

- bus acquisition,
- marketing and education: interpretive signage visitor education, and advertising,
- training for park and concessionaire staff – especially for a new tour offering, and
- staging areas, bus stops, benches, and other tangible infrastructure components.

Given the small scale of the system, these investments are not large barriers. If the district is unsuccessful, investments in rolling stock could be easily transferred to other parts of the park; benches and staging areas could help support other large vehicles (charter bus and RVs).

Opportunities

Current timing is excellent for a pilot Tour District in the Canyon Area. Yellowstone and its partners have several local investments that will come to fruition over the next 2 years, including:

- renovation of 8 historic Old Yellow Buses,
- availability of Original Equipment Manufacture (OEM) New Yellow Buses,
- renewal of the Xanterra's 5 year concessionaire contract beginning November 2005,
- landscape renovations of prominent Canyon Area overlooks: Inspiration Point, Brink of the Upper Falls, and Artist Point, and

- new Canyon Area Visitor Center.

A Canyon Area Tour, in conjunction with these other efforts, would help showcase the Grand Canyon of Yellowstone as a premier destination within the park.

Benefits

The major benefit of a tour district in the Canyon area, and the motivation behind this study, is enhancement of the visitor experience. The district would help achieve long term goals of the park by offering new and unique interpretation opportunities. Additional benefits include:

- an enhanced offering for seniors and persons with disabilities,
- potentially reduced air and water pollution,
- potentially reduced traffic and parking congestion, and
- an opportunity to evaluate visitors' perceptions of transit in the park on a very small scale.

Next steps

If management concurs that a Tour District in Canyon is desirable, park management should ask the concessionaire and/or other tour operators to submit a proposal, with all of the relevant operating details. Yellowstone should further research funding opportunities for costs associated with rolling stock, infrastructure, and marketing support. If implemented, the ultimate success of the system could be judged by answering the simple questions of: are the tour buses full, and are riding visitors enjoying the new interpretive experience of a Canyon Area Tour?

Appendix A: Estimated Transit System Costs

As mentioned earlier, a transit system was initially considered in the Canyon Area. Table 6 estimates cycle time of a Canyon Area transit district. All data is based on the assumptions used in Tables 2, 3, and 4, and any exceptions are defined below.

Number of stops: increased from 4 to 11, to include all of the overlooks and additional stops at Canyon Village services, campgrounds, etc.

Time spent at each stop: reduced from 15 minutes to 2, since passengers will simply be boarding and disembarking at each stop, with minimal interpretation.

Driver recovery time: reduced from 15 minutes to 5 minutes, since the overall cycle time is shorter and the frequency is greater.

Cycle time: decreased to reflect transit versus touring, from 118 minutes to 60 minutes. This is primarily a result of less time spent at overlooks for interpretation.

Table 6 Cycle Time for Transit

Roundtrip distance in miles	10.4
Drive speed in mph (average)	20
Number of stops (overlooks)	11
Time spent at each stop in minutes	2
Driver recovery time in minutes	5
Cycle time in minutes	**60**

Table 6 estimates a 60 minute cycle time for a Canyon Area transit system. Even if the cycle time was optimized, it would be unrealistic to try to improve upon one completed service route per hour. Table 7 includes this as an assumption. Table 7 estimates costs for the Canyon Area transit system. All data is based on the assumptions used in Tables 2, 3, and 4, 5 and 6 and any exceptions are defined below.

Frequency: 3 potential frequencies or headways are estimated, once every: 60 minutes, 30 minutes, and 15 minutes.

Season length: increased from 71 days (5 days a week) to 100 days (7 days a week).

Daily operation length: set at 8 hours to coincide both with service demand and a typical driver's work shift.

Vehicle capacity: the New Yellow bus capacity is used, as shown in Table 5.

Daily operation duration: roughly 9:00am to 5pm, with times shifting due to any increases in frequency.

Number of vehicles: given a 60 minute cycle time, 1 vehicle is added for every increment in frequency. For example, 15 minute frequency is one vehicle every ¼ hour and therefore 4 vehicles.

Average occupancy: 50% and 80% occupancy rates were used as estimates. These estimates are based on estimated ridership on the Yellowstone Lake Sunset Tour. Xanterra estimates average occupancy at 85% or greater. Although this is a tour and not transit, it is the only available comparative data. 50% and 80% were used to illustrate costs, and a more effective establishment of ridership should be conducted via visitor surveys, if the park were to pursue transit.

Cost per season: calculated by multiplying vehicle hours per season by cost per hour per vehicle by number of vehicles.

Table 7 Transit Costs at Varied Frequencies

	Frequency					
	1 Hour		30 Minutes		15 Minutes	
Season length in days (7 days/week operation)	100	100	100	100	100	100
Cost per hour/vehicle	$90	$90	$90	$90	$90	$90
Daily operation duration in hours	8	8	8	8	8	8
Operation plus 25% overhead in hours	10	10	10	10	10	10
Number of vehicles	1	1	2	2	4	4
Trips per day	8	8	16	16	32	32
Vehicle capacity	20	20	20	20	20	20
Average occupancy	50%	80%	50%	80%	50%	80%
Average daily ridership	80	128	160	256	320	512
Number of riders per season	8,000	12,800	16,000	25,600	32,000	51,200
Cost per season	**$90,000**	**$90,000**	**$180,000**	**$180,000**	**$360,000**	**$360,000**
Average cost per rider	**$11**	**$7**	**$11**	**$7**	**$11**	**$7**

Published articles support transit headways of 30 minutes or less (Gilbert, 2002; Regina Transit, 2002), and successful parks in the national park service offer transit headways of less than 15 minutes during peak hours (Acadia, Zion, & Yosemite National Parks, 2003). Given the geography of the Canyon Area, and that the overlooks offers incredible views but no other services (shopping, food, etc.) a minimum of 15 minute peak hour headways is recommended.

Table 7 estimates that a system with operational costs of $360,000 would move 30-50,000 people and require fare box or subsidy income of $7-11 per rider. These numbers assume a

voluntary system with an estimated 50-80% occupancy rate. Again, these numbers are estimates, based on the current Sunset Tour (not transit) of the Lake Butte area. For a voluntary system, these occupancy estimates are likely high. To put these numbers into perspective, with these estimates, at 100% ridership, the transit system would cost $360,000 per season to transport 640 people per day at $6 per person. 640 people per day would amount to less than 4% of the over 17,000 daily peak season visitors to the Canyon area. Based on these results, a voluntary transit system in the Canyon Area is financially infeasible. If Yellowstone management were to make transit mandatory, ridership numbers would dramatically increase. Additionally, using buses with higher capacities could also reduce average cost per rider, especially buses with trailers that have a high capacity while maintaining good turning radii for the Canyon geography. Although, cost of operating these vehicles may be higher and rider interest in a standard vehicle may be lower.

It is considered impracticable to charge visitors in the vicinity of $10 for a 10 mile bus ride and expect ridership to be anywhere the 50-80% range. Thus the majority of the $90,000 to $360,000 annual operating costs would need to be subsidized. Since a requirement of the analysis was that a system not have a significant adverse effect on either park base operating dollars or existing fee dollars, a transit system appears to currently financially infeasible. In addition, although congestion problems do exist, they do not appear to be of a magnitude that a transit system is really necessary.

However, an interpretive tour on interesting vehicles over the same route seems to be quite feasible from a financial and visitor acceptance perspective.

Appendix B: Acknowledgements & References

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Barron, Thomas. 2004. Feasibility of a Clean Bus Tour District in Yellowstone National Park. Unpublished, on-file, Yellowstone National Park

Bignardi, Paul. 2005. Marin Headlands & Fort Baker Estimated Costs and Revenues, unpublished, on-file, Golden Gate National Recreation Area.

Bignardi, Paul (Golden Gate National Recreation Area). 2005. In-person interview, unpublished.

Bond, Rich (Glacier Park Inc.). 2005. Phone-interview, unpublished.

Federal Highway Administration (FHWA). 1990. As printed in the Yellowstone National Park Parkwide Road Improvement Plan.

Gilbert, Richard. 2002. Sustainable Transportation Performance Indicators (STPI) Project. The Centre for Sustainable Transportation.

National Park Service. 1974. Yellowstone National Park Master Plan.

National Park Service. 1984. National Park Service Park Road Standards.

National Park Service. 1994. Alternative Transportation Modes Feasibility Study.

National Park Service. 2003. Photo 3 New Yellow Bus Prototype at the Grand Teton National Park.

National Park Service. 2003. Public Use Statistics Office (STATS), available: http://www2.nature.nps.gov/mpur/index.cfm

National Park Service. 2005. Map 2 Canyon Area Roads and Overlooks

National Park Service. 2005. Yellowstone Facts Website, available: http://www.nps.gov/yell/pphtml/facts.html

Regina Transit. 2002. Regina Transit Service Review.

Scott, Todd (Xanterra Parks & Resorts Inc.). 2005. Phone-interview, unpublished.

Threatened and Endangered Species System (TESS). 2005, available: http://ecos.fws.gov/tess_public/TESSWebpageVipListed?code=V&listings=0#A

Xanterra Parks & Resorts Inc. 2005. Map 1 Yellowstone with Canyon Area Circled, available: http://travelyellowstone.com/galleries/img_yellowstone_map_g.htm

Xanterra Parks & Resorts Inc. 2005. Yellowstone Lake "Historic" Sunset Tour by 1937 Touring Bus, available: http://www.travelyellowstone.com/dynamic/mz_viewer.htm?articleid=162

Yellowstone National Park. 1992. Parkwide Road Improvement Plan Environmental Assessment.

Yellowstone National Park. 2000. Long-range Interpretive Plan.

Yellowstone National Park. 2002. Visitor Services Project.